

The Clean Water Act at Work: The Wonderful World of Wastewater Treatment

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- Wastewater Treatment Process
- CWA Regulation Of Process
- Challenges For The Future

Pre-Sewer Era 1800 to 1880

- Bodily Waste
- Population Growth
- Industrial Revolution
- Modern Cities
- Cesspools/Privy Vaults
- Water Closets
- Septic System
- Chemical Wastes
- Sanitation and Public Health Issue



Sewer ERA Begins 1900s

- East Coast Cities Sewers
- Enclose Tributaries
- Communicable Diseases
- Dead and Smelly Rivers
- Philly Airport
- 1920s Solids Removed
- Sewage Sludge
- Ocean Dumping



Brighton's Intercepting Sewer, 1874.

Modern Treatment Era

- 1948 FWPCA
- Research/Funding
- 1970s Polluted Waters
- 1972 CWA
- Construction Grants
- Regional Wastewater Treatment Facilities
- POTWs



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Who Are These Folks?

- True Environmentalists
- Public Servants
- Protecting Public Health
- 16,000 POTWs
- 100,000 pumping stations
- 800,000 miles of sewers
- 32 Billion Gallons per day
- U.S. Toilets
- Dirty Job



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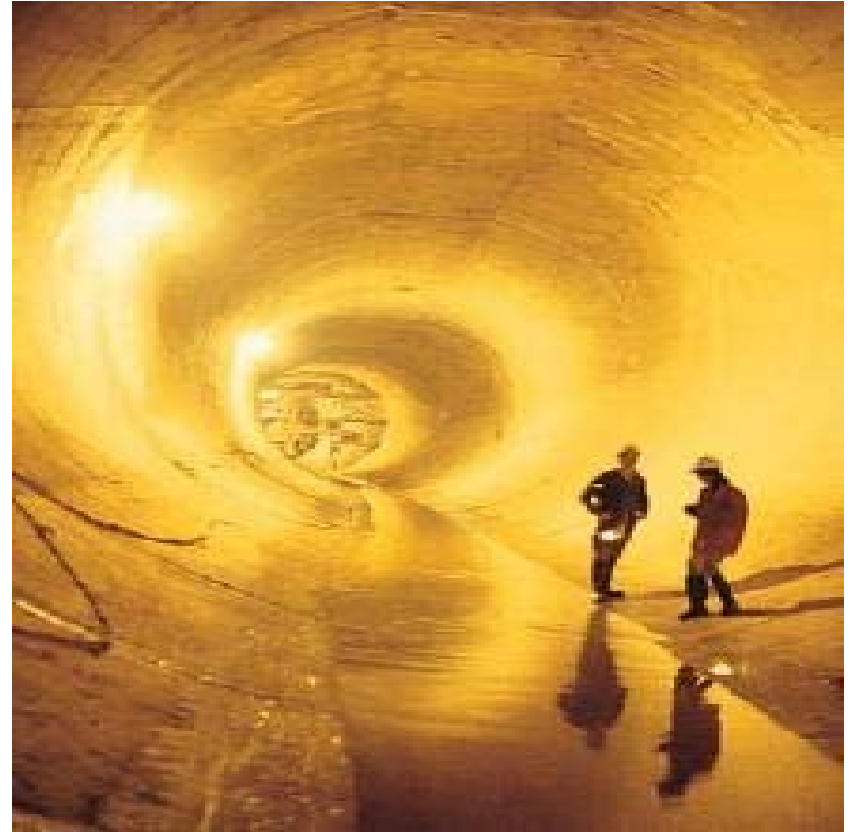
How Do They Do It?

- Industrial Pretreatment
- Eliminate Contamination
- Pass Through/Interfere
- Industrial User Discharge
- Chemicals
- Limit Materials and Quantities
- Plant Can Safely Process



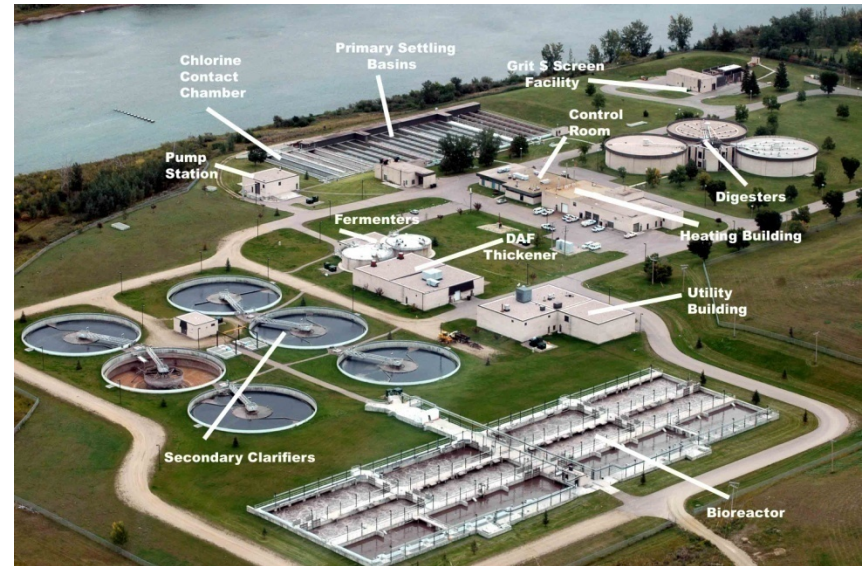
The Collection System

- Toilets and Sinks
- Ordinary Domestic Sanitary Wastewater
- Sewer Laterals
- Main/Trunk Sewers
- Interceptor Sewers
- Gravity Fed System
- Pumping or Lift Stations



Wastewater Treatment Plant

- Screens Remove Trash
- Wood, Rocks, Animals
- Open Basins Release Dissolved Gases
- Hydrogen Sulfide
- Organic Material Decays
- Aeration bubbled Oxygen
- Suspend Organic
- Inorganic Settles
- Grit – gravel and sand



Primary Treatment

- Sedimentation Tanks or Clarifiers
- Lighter Materials
- Oil, Grease, Soap
- Floats on Top – Scum
- Heavier Solids Sink to Bottom of Tank
- Primary Sludge
- Fed to Digesters



Secondary Treatment

- Digesters – Big Stomachs
- Biological Process
- Activated Sludge
- Microorganisms – Bugs
- Naturally Decomposes Sewage
- Food and Oxygen
- 20 Day Process
- Heat Reduces Pathogens
- Produces Methane Gas



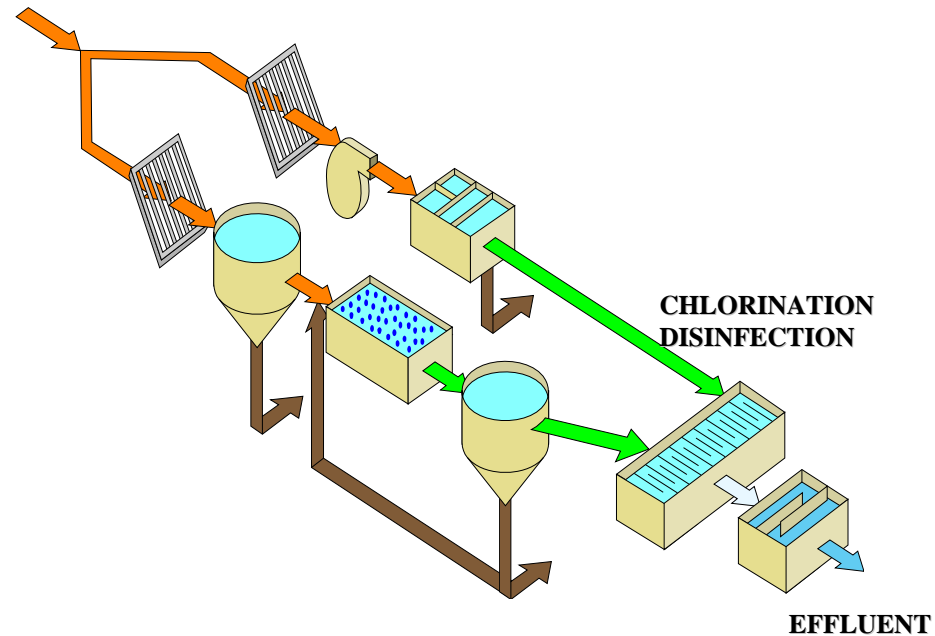
Biosolids

- Centrifuges Remove Excess Water
- Class “B” Biosolids Cake
- Truck or Train Transport
- Farms/Reclamation Sites
- Landfill
- Compost or Heat Drying
- Reduce Pathogens More
- Class “A” Home Garden Fertilizer



Effluent

- Filtration Sand or Carbon
- Reduce Bacteria and Turbidity
- Chlorine Contact Tanks
- Kills Remaining Bacteria
- Sulfur Dioxide
- Neutralize Residual Chlorine
- Sensitive Aquatic Life



CWA Regulation

- CWA ■ 307(b)
- Pretreatment Standards
- 40 CFR 403, *et seq.*
- National General and Specific Discharge Prohibitions
- Pass Through
- Interference



Specific Prohibitions

- Corrosive pH < 5
- Solid or Viscous
- High Temp. >104 F $\#$
- Non-biodegradable Oils
- Producing Toxic Vapors
- Potentially Explosive –
Flashpoint < 140 F $\#$
- Interfering Flow Rate or
Concentration
- Trucked or Hauled



National Categorical Standards

- Created Categories
- Numeric Limits
- Electroplating/Copper
- Even Playing Field
- Local Limits
- More Stringent
- Floor Not Ceiling
- Site Specific Data
- Dye Manufacturer

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"I remember when there was no damn environment."

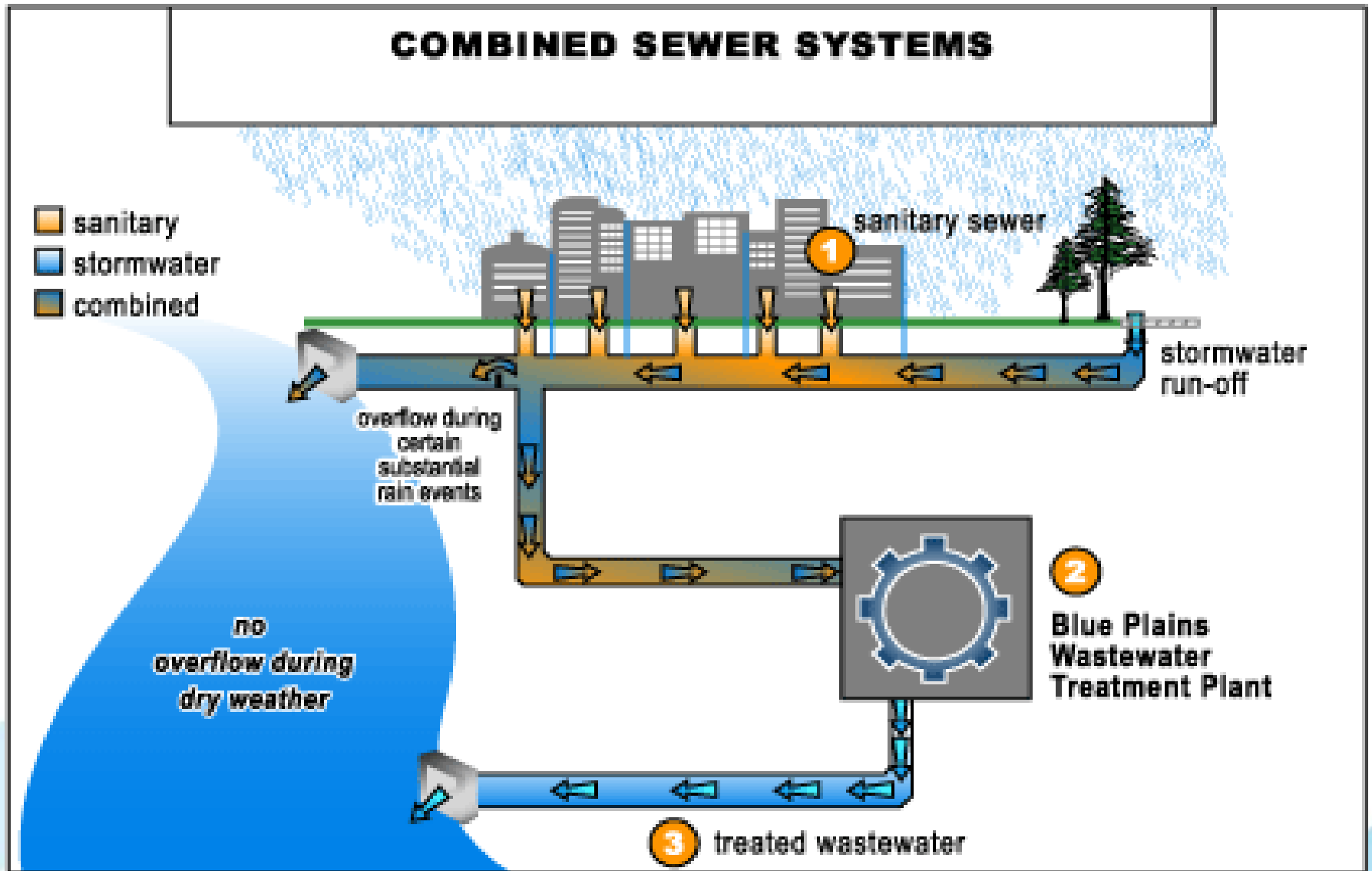
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Industrial Discharge Permits

- Delegated Authority
- Regulator
- Violations
- Enforcement Action
- Fines/Corrective Action
- Consent Order
- Revoke Permit
- Collection System



Combined Sewer Overflows



CSO Regulation

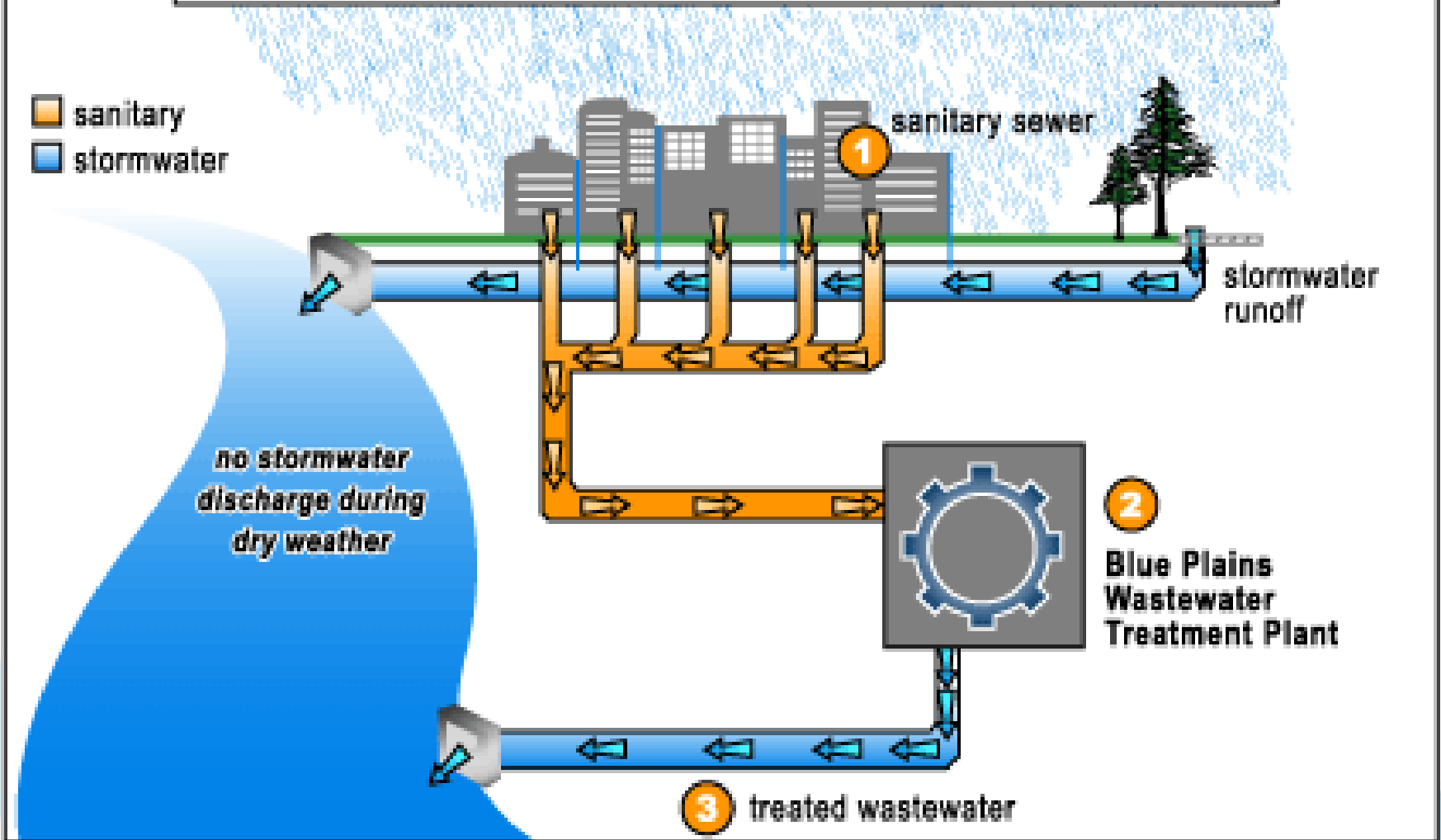
- Point Source Discharges
- NPDES Requirements
- WQS Via LTCP
- 1994 CSO Policy
- Presumed Compliance
- 85% CSO Capture
- 4 M CSOs Per Year
- In 2000, CWA § 402(q)(1)



Sanitary Sewer Overflows

SEPARATE SANITARY & STORMWATER SEWER SYSTEMS

- sanitary
- stormwater



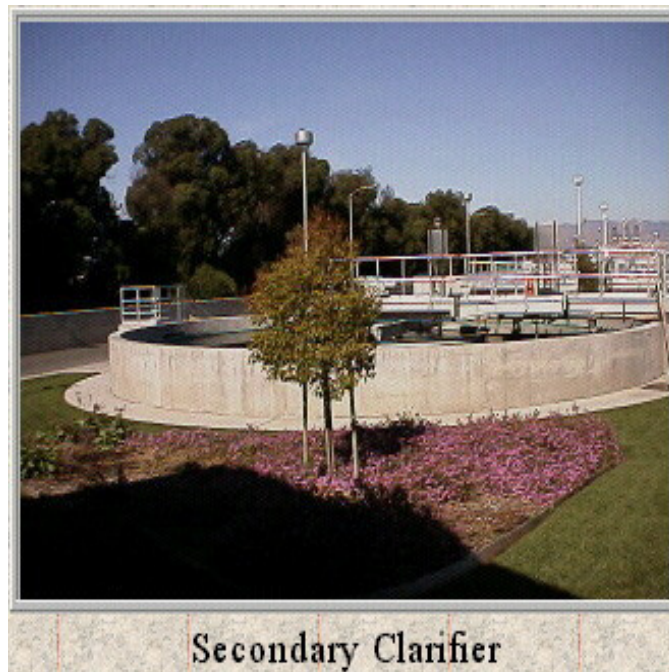
SSO Regulation

- SSOs illegal
- Impossible Standard
- FAC 1994-1999
- Reasonable Regulation
- 2001 SSO Rule
- Bush Administration
- Further Review
- Obama Administration



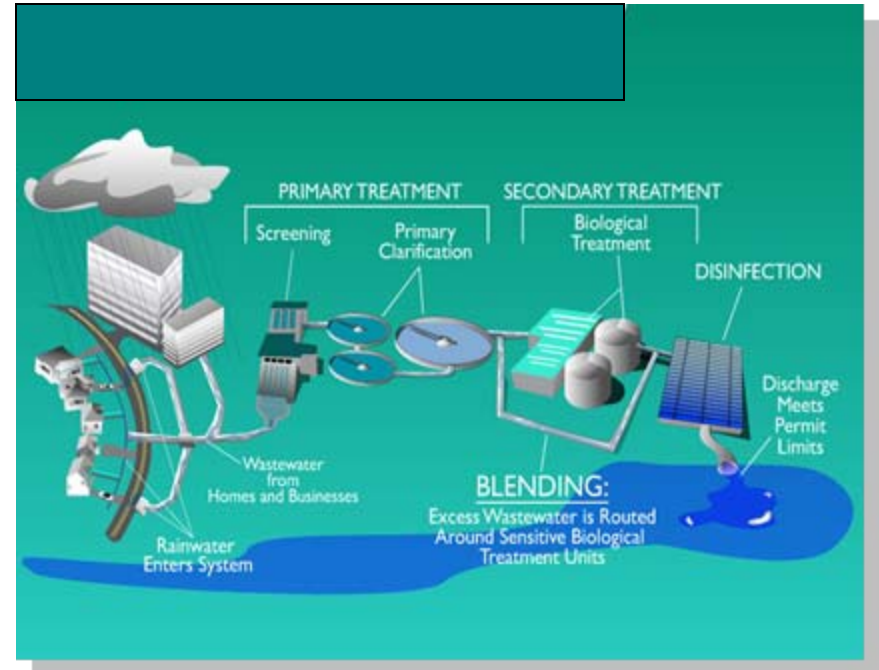
Secondary Treatment

- CWA Doesn't Dictate Operations
- Focuses On Output
- Every Plant Different
- CWA ■ 301(b)(1)(B)
- Effluent Limitation Guidelines
- 40 CFR 133.102
- Enforced Through NPDES Permits



NPDES Permits

- Point Source Discharge
- Like Industrial Permits
- EPA or State Issues
- Effluent Limits
- Reporting/Monitoring
- Violations
- Enforcement
- Consent Decrees
- Civil Penalties/Prison



Permitting Process

- Five Year Term
- 180 Days
- Two Years to Negotiate
- Continue Administratively
- Publish Draft for Public Comment
- Public Hearings
- Appeal to EAB/State Ct.
- CWA ■ 402(k) Permit Shield



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Regulating Biosolids

- NPDES/Effluent
- Treatment Residuals
- Useful Nutrients
- CWA ■ 405
- 40 CFR 503
- Risk-Based Regulation
- Protect Human Health
- Class “A” and “B”



Beneficial Reuse

- Treatment Process Continues in Soil
- Pathogens Reduced
- 60% Land Applied
- 20% Incinerated
- 17% Landfill
- 3% Reclamation Work
- Western PA
- Zinc Smelting Site



Future Challenges

- Federal/State Regulation
- NIMBY
- Odor
- Safety
- Risk Assessment
- Local Government Bans
- Preemption
- Better Ideas?

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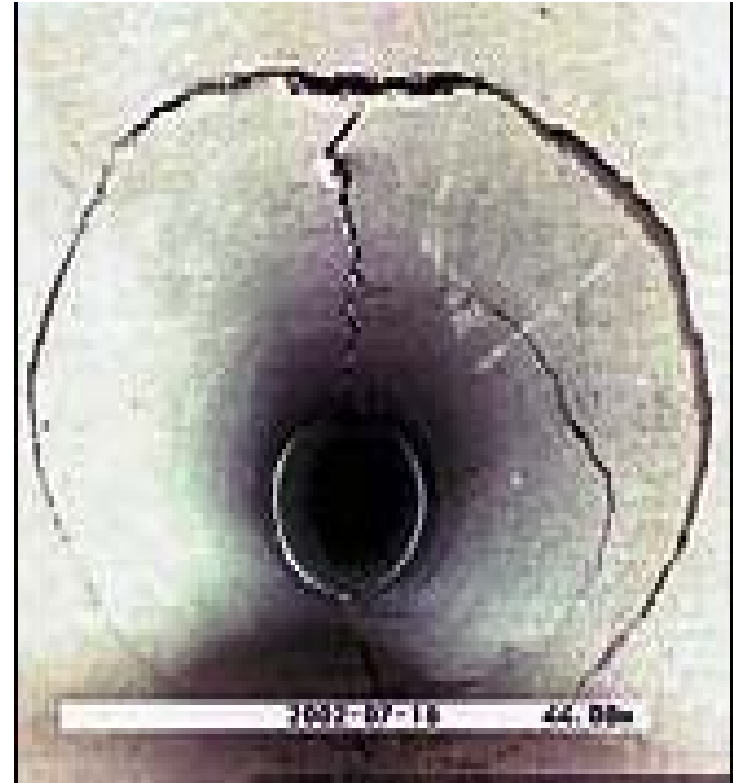
Non-Point Sources

- CWA Point Sources
- Non-Point Sources
- Agriculture
- Chesapeake Bay
- Nutrients
- Algae Blooms/DO
- Kills Aquatic Life
- DCWASA Blue Plains
- Billions in Nutrient Limits
- No Difference in WQ
- Watershed Act?



Infrastructure

- Funding Crisis
- Bridges, Roads, Pipes!
- Old Age 100yrs+
- Expect Toilets To Flush
- 1987 Grant Program Replaced by CWSRF
- Recovery Act \$4 Billion
- \$500 Billion Next 20yrs
- Trust Fund/Flush Tax?



Time To Think Creatively

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"Never, ever, think outside the box."

Thank You

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